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‘Back to the future’? Urban backyards and food self-sufficiency

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ABSTRACT

Against a background of an escalating world population, there are now more people living in urban environments than elsewhere. While historically urban households have supplemented the family diet from the backyard vegetable garden, in periods of economic upturn (e.g., post- World War II) there has been a tendency for a transition from household food production to relying on supplies from commercial food outlets. In times of economic hardship there has been a switch back to backyard food production. In recent decades, even in the absence of major crises, there has been an increase in interest in growing ‘healthy foods’, and thus greater household food production. However, urban consolidation, and the associated reduction (or elimination) of the backyard have greatly reduced the space for household food production. With the continued increase in urbanisation predicted, associated loss of productive agricultural lands to urban sprawl and commitments of world leaders to reduce carbon emissions in response to climate change, the need for transition back to greater urban self-sufficiency will become a reality. Arguably, the major impediment to such an outcome has been that ‘food’ has not been embedded as a ‘community system’ along with others (e.g., housing, water) in planning. Increasingly this deficiency is being addressed but to maintain the current trajectory and momentum requires broad community participation in government policy development. Only then, will the increasing need to go back to the future and transform the urban landscape in support of greater food self-sufficiency be addressed.

1. Introduction

‘Urban agriculture is the cultivation of plants … within urban and peri-urban areas’ (FAO, 2018, p. 1). This type agriculture provides approximately 15% of the world’s food supply (Gerster-Bentaya, 2013), and production continues to increase (Bourque, 2000; Burgin, 2018). Such agriculture may take many forms including ‘… small-intensive urban farms, food production on housing estates, land sharing, rooftop gardens and beehives, school-yard [sic] greenhouses, restaurant-supported salad gardens, public space food production, guerrilla gardening, allotments, balcony and windowsill vegetable growing’ (Schupp and Sharp, 2012, p. 1), or any other means of producing vegetables within urban areas (Burgin, 2018). These different forms of agriculture vary ‘enormously’, with one fundamental division. ‘Community gardens’ are public and ‘backyard gardens’ are private (Ferris et al., 2001). A backyard garden that produces food to supplement the household requirements may therefore be viewed as a subset of ‘urban agriculture’, and is the topic of this article.

In the current context, the definition of a backyard garden (cf. dooryard, urban, kitchen, home, household gardens (Niñez, 1987); familiar urban, vernacular urban, house-lot gardens (Kimber, 2004)) used is an adaptation of Kimber (2004, p. 263) and incorporates ‘common, ordinary gardens around the house, or substitutes for them, developed for production of useful, material goods … for individual households’.

These gardens have been considered a permanent feature of households (Taylor and Taylor Lovell, 2014), and are possibly the oldest form of agriculture (Diamond, 2006). Indeed, supplementing the household food supply from backyard gardens (or elsewhere close by) has occurred throughout human history. In modern times, at least in industrialised countries, supplementing the family diet with food from the garden has ‘waxed and waned’. Typically, in times of economic crisis, or threats to the supply of food more generally (e.g., during periods of war), urban food production increases substantially. As has occurred in Australia (Larder et al., 2014), this has been frequently due to governments’ urgings, only to wane with the end of the emergency and/or with economic upturn. Despite the importance of urban food production, beyond periods of threatened or actual food shortages, the topic has been one of the most ‘overlooked, understudied, and unsupported by government agencies, non-government organizations [sic] and academics’ (Taylor and Taylor Lovell, 2014, p. 285). Within the Australian context, the history, current situation, and potential future of self-provisioning can be regarded as the most basic, and enduring, level of agriculture: the ‘backyard veggie garden’.

I have commenced with definitions of ‘urban agriculture’ and ‘backyard garden’. In the next section a brief introduction to trends in backyard gardening to supplement household food requirements will be

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discussed. This is followed by consideration of the influence of urban development on backyard gardens, and the consequences for the associated vegetable garden. I subsequently consider current trends in household backyard food production, and conclude by commenting on the future of urban production. In developing this article, I have used the Australian context as a 'case study'. However, largely due to the paucity of quantitative data about domestic production in Australia (Larder et al., 2014), examples from research undertaken in other industrialised countries deemed relevant to the Australian context are included.

2. Trends in the use of backyard gardens to supplement household food requirements

Food production on small plots of land adjacent to human settlements is the 'oldest and most enduring form of cultivation' (Niñez, 1987, p. 168). To produce supplies to supplement household requirements, this form of agriculture has occurred throughout history anywhere humans have formed settlements (e.g., Australia – Burgin, 2015; Cochrane, 2006; Newling, 2015; America - Diamond, 2006; Doolittle, 2004; Whitmore and Turner, 2001: Southeast Asia, Southern China - Kehlenbeck and Maas, 2005: numerous Pacific islands - Diamond, 2006). The excess food produced has typically been distributed among neighbours, friends and/or relatives, sold, or bartered. In recent history, the practice of vegetable gardening has continued in Australia.

In industrialised countries (e.g., Australia, Europe, North America), with the onset of crises that result in the threat (or reality) of food shortages, such as in times of war, households quickly revert to urban agriculture, including growing food in their backyard to supplement household requirements. For example, in World War I, between 1917–1918, 'amateur gardeners' overcame food shortages, and even produced an excess in the United States of America (Cole, 1993). Also in the U.S., in the Great Depression and World War II, household gardens produced more than 40% of the country's fresh food (Cole, 1993; Naimarck, 1982; Niñez, 1987). In its most successful year (1943) the number of garden plots tended by household gardeners exceeded the government's target by two million, and the previous year's target by more than five million (Cole, 1993). Germany also relied on home gardens for food during the post-World War II reconstruction (Niñez, 1987). Produce from Australian cities, including backyard gardens, has also made a 'significant' contribution to food production during times of war (Houston, 2005; Larder et al., 2014; Mullins and Kynaston, 2000), although the relative contribution between public and private gardens is typically not identified.

In Australia, the popularity of supplementing the household diet with home grown produce has paralleled the economic trends that occur in the U.S. and other Western countries (see e.g., Hall, 2010, 2015). For example, in the first years of European settlement in Australia, necessity demanded that colonists grew food for their household requirements (Burgin, 2015; Cochrane, 2006; Newling, 2015). More recently, during World War II, in response to 'massive food shortages', the Federal Government encouraged a significant upsurge in food production which was achieved (McKernan, 1995). It was with Australia's post-war affluence that prompted a greater desire for 'leisure', that there was a transition from supplementing the household diet with produce from the backyard garden (Dyson, 2009) to relying on the local supermarket and dining out, and thus the demise of self-provisioning from the backyard vegetable garden. Indeed, by the end of the twentieth century, some considered that growing food in the Australian backyard to supplement the household 'formed part of a bygone era' (Gaynor, 2001). Although Gaynor (2001) suggested that by that time, in part due to the 'impact of rolling recessions' and changing environmental views, there appeared to have been a 'renaissance' in growing produce in the home garden.

Overall, in the U.S. there has also been a long-term overall trend away from 'self-provisioning' from the garden to supplement the household budget (Schupp and Sharp, 2012). However, as has occurred in Australia (Gaynor, 2001), in times of economic downturn, for example, with the economic recession of the 1970 s and 1980 s, there is a surge in home gardening to supplement family requirements (Gladwin and Bulter, 1982; Niñez, 1987). Indeed, Gladwin and Bulter (1982) reported that the estimated harvest of produce from U.S. gardens in 1981 was one billion dollars. As Niñez (1987) suggested, these trends indicate that gardening to supplement the household requirements typically reflects the economic trends of a Nation more broadly. When employment is plentiful and workers well paid, urban backyard vegetable gardens transition into recreational spaces with the reverse occurring when supplementing the household income becomes desirable with a downturn in the economy.

3. Influence of urban development on backyard gardens

In parallel, with the decline of the backyard garden to support the household diet, urban populations have continued to increase to the point where more than 50% of the World's population now live in urban areas. It is predicted that by 2050, 70% of the global population will be urban (Parfitt et al., 2010). Cities will thus undoubtedly continue to encroach on productive non-urban agricultural landscapes (e.g., Australia – Burgin et al., 2016; Great Britain and U.S. – Best, 1968; U.S. – Theobald, 2001). For example, in North-Western Sydney it was planned that between 2005 and 2036, almost 25% of new urban homes for Sydney will be developed. Much of this land is currently under agriculture (Burgin et al., 2016; New South Wales Department of Planning, 2005): often intensive agriculture (e.g., greenhouse produce, mushrooms, poultry;id, 2010; Burgin et al., 2016). The agricultural production associated with this land will, therefore, be lost with the transition to urban space and commercial food production will necessarily move further from the urban market (Burgin et al., 2016).

Some food will be produced in the urban backyard gardens that replace agricultural lands. However, the size of the garden will limit the extent of self-provisioning that occurs. For example, in Sheffield (England), Smith et al. (2005, p. 235) observed that 'garden size played an overwhelming role in determining garden composition', and that larger garden areas were more likely to have a proportionately greater coverage of land under cultivation to support self-provisioning than smaller gardens. Likewise, the coverage of lawn tended to differ. For example, in the U.S., the proportion of lawn was observed to be proportionately greater in larger than smaller gardens (e.g., Robbins and Burkenholtz, 2003; Runfola et al., 2013). Measured as approximately 23% in larger gardens, Robbins and Burkenholtz (2003), observed that the area of lawn around the home had increased over time as a relative proportion of allotment area. These data indicate that at least in larger gardens, there is likely to be competition for space between plantings to support self-provisioning and lawn.

Another factor, influencing the potential to self-provision from the home garden is that within cities (e.g., Australia – Hall, 2010, 2015; New Zealand – Mullins, 2008; U.S. - Burke, 1991), the density of housing has increased in recent decades. In Australia, increasing demand for urban dwellings has occurred along with a transition to smaller allotment size. For example, Hall (2010, 2015) reported that until the late 1980 s most Australian urban allotments were 'several' times larger than currently. In established suburbs, the houses typically covered 20–30% of the allotment with a maximum of 35–40% coverage. More recently (post-1980 s), allotment sizes have decreased and dwelling size increased such that the previous maximum-sized dwelling has become the minimum, and there has been a substantial downsizing in allotment size. Consequently, the area behind the house and the narrower width at each side of the dwelling that were previously available for self-provisioning gardens has often disappeared with the changing dimensions of house and allotment. As a result, urban backyards are often less than 50 m^2 (0.01 acre), although some backyards may be as large as 100 m^2 (approximately 0.02 acre). Hall (2010, 2015)

suggested that with these changes there is often insufficient space and sunlight to grow fruit and vegetables (or indeed most garden plants) in many modern Australian urban backyards.

Hall (2010, 2015) reported that the reduction in Australian urban allotment size was 'immediate and dramatic'. He suggested that this change 'coincided exactly' with longer working hours for middle and higher income office workers although, as he undoubtedly recognised, the situation was more complex. For example, the country's post-war affluence was reflected in full employment of males for the first time in Australia's history, and there was also an 'enormous' growth in female participation in the workforce (Broomhill and Sharp, 2005; Nolan, 2003). However, from the mid-1970 s this upward trend was reversed. Rates of unemployment and underemployment began to rise to levels above the earlier segment of the post-World War II boom. This was paralleled with an increase in the hours and intensity of work for the employed (Broomhill and Sharp, 2005; Hall, 2010, 2015; Watson et al., 2003). An outcome of this downturn in employment was that a greater number of workers held multiple jobs. This changed the work environment, especially, with large numbers of females entering the workforce for the first time. Consequently, many Australian family units (Broomhill and Sharp, 2005) no longer had a single 'breadwinner' and thus often no female to 'keep the home fires burning' or indeed the vegetable garden producing. The 'baby boom' that also occurred post-World War II (Collins, 2008) would have had a further impact on many family units with women of child-bearing age, and often their parents, taking time away from the vegetable garden to tend to children. With these changes in the dynamics of the family unit, priorities would necessarily have been reassessed. Based on trends associated with economic changes in Australia (and undoubtedly in other industrialised countries), and outlined above, it could be assumed that, particularly within dual income family units, the importance of the vegetable garden to support the household budget would have diminished.

Another factor that has influenced the post-war change in culture in Australia (Collins, 2008) and elsewhere (e.g., Great Britain - Favell, 1998; U.S. - Rumbaut, 1994; France - Freeman, 1979) was immigration. Australia made a concerted effort to attract migrants as settlers (Collins, 2008), and migration continues to be a feature of Australian political policy. This is reflected in the observation that in 2016, almost 30% of Australians were born overseas (ABS, 2017).

Head et al. (2004) interviewed migrant Australians from Macedonia (and Italy), Vietnam, Britain, and first-generation Australians of migrant parents. They concluded that while few of their participants had fully self-sufficient backyard food production, for many elderly migrants and particularly those of Macedonian and Italian background, memory, tradition, and change was reflected in their gardens. Together with Vietnamese migrants, they continued the culture and traditions that they carried with them from their homelands. Consequently, despite a more general demise of the backyard garden in the Australian community, Head et al. (2004) and others (e.g., Armstrong, 1999; Gleeson et al., 2001) observed that backyard food production among migrants reflected the pattern of life experienced in their homeland. This occurred, even when the growing of food was no longer simply a matter of economics. Among the Anglo-Celtics, Head et al. (2004) found that some also embraced productive gardens while others favoured recreational gardens. In these latter garden types, the emphasis was on low maintenance and decorative plants rather than a focus on food production. This was not a consideration of Macedonian or Vietnamese gardeners.

Whether to maintain a 'way of life' among migrants or simply to supplement the household diet, one impediment to providing produce for the household from the vegetable garden is the space available in the backyard due to the trend towards smaller allotments and larger houses. This may be one reason why, unlike the migrants who typically maintained backyard gardens, Head et al. (2004, p. 346) reported that 'intensive food production virtually disappeared within a generation of migration'. These researchers reported that gardening habitats of second generation migrants reflected 'socioeconomic conditions of contemporary urban life'.

4. Changing face of the urban backyard and implications for the vegetable garden

In the U.S., the size of a family home increased three-fold between the 1950 s and 2005. Wilson and Boehland (2005) suggested that this change resulted in more land being occupied. As observed in the U.S. (pers. obs.), historically, Australia had a housing system that included low density (i.e., free-standing homes on discrete allotments) suburban housing. Australians also have a high level of home ownership, typically owner-occupied, fully detached, and single-family occupied. By the turn of the twentieth century owner occupation stood at 40% of Australian households. Low density construction continued in parallel with increasing home ownership. Fifteen years after World War II, home ownership in Australia was 70% and, in 1999 more than 90% of Australians who were middle-aged or older had owned their home at some stage of their life (Berry, 1999). Home ownership remained high in 2016, 65% of Australians owned their home (Stone et al., 2017). Although the trends in home ownership differ between Australia, and for example, the U.S., the mechanisms of affluence and employment levels act as incentive to buy a home in both countries (e.g., see Hughes, 1996).

In Australia, the demand for urban housing results in suburbs expanding outward in what Kelleher (2001) referred to a 'a rolling wave' from the densely populated inner suburbs of major cities. With this urban expansion, there has been a trend towards smaller urban allotments and an increase in medium density housing. For example, apartments and townhouses (semi-detached dwellings on strata titled land) are often preferred (Berry, 1999), rather than the 1940's home with a substantial backyard. Indeed, in 2016, more apartments than free-standing houses were built in Australia's major cities. The largest discrepancy occurred in Sydney where, in 2017, apartments accounted for 28% of all housing (Ticher, 2018).

The larger urban allotments directly resulted from the colonialist's household needs for self-sufficiency. For example, in the initial phases of urban development, allotment size in Australia varied, but was typically one acre (4048 m^2) in Brisbane (Queensland), a quarter acre (1012 m^2) in Newcastle (New South Wales), and half an acre (2024 m^2) in Adelaide (South Australia). This relatively low density enabled multiple generations of households to achieve a high degree of self-sufficiency from their backyards (Troy, 2004). This high level of food production from the home garden has been considered a reason for the affluence of Australian colonists in the late nineteenth and early twentieth centuries (Mullins, 1981, 1988; Troy, 2004). Troy (2004) suggested that with the subsequent development of extensive agriculture, and improved transportation, distribution, marketing, and storage of food, resourcing the family from the backyard garden was less of an imperative than previously. The result was a reduction in domestic vegetable production.

The introduction of advanced food preparation (e.g., frozen food was first introduced into Australia in the 1940 s - Birdseye, 2016) would have made purchasing some produce more convenient than growing food. This is evidenced by the decline in the time spent in meal preparation in the last 50 years due to increasing dependence on frozen foods (Frozen Food Foundation, 2018).

In addition to the convenience of frozen foods, the introduction of reticulated water (i.e., piped water supplied by the municipality or other level of government) further changed the effective size of the allotment for gardening. This is because piped water saw the demise of the backyard rainwater tank that allowed for water to be captured and stored on-site (Burgin and Webb, 2011). Without the need for space for a tank, there was even less need for a large backyard than merely abandoning the vegetable garden. For example, in inner urban suburbs of Australian cities, allotments began to shrink to one eighth (506 m^2)

of an acre or smaller. However, middle/outer distance suburbs tended to retain the quarter acre (1012 m^2). The latter allotment size was retained until soon after World War II when domestic services (e.g., reticulated water; municipal rubbish disposal) were introduced (Troy, 1996, 2004).

Nevertheless, it was not until the 1980 s that population growth, resulting urban sprawl, and diminishing population density in the inner suburbs of the major Australian cities resulted in the first shift to 'urban consolidation' (Coffee et al., 2016). At that time, there was an attempt to constrain urban areas within pre-existing boundaries by increasing the population density in inner and middle distance suburbs from the city core. Urban consolidation included, for example, 'battleaxe blocks' (sub-division to allow for a new allotment at the rear of an established dwelling with a fence-line driveway to provide access). High rise apartments, and townhouses also often replaced the earlier single allotment dwellings of the inner suburbs. In the early 1980 s, the policies of urban consolidation resulted in further reductions in urban allotment size in many areas in both new and redeveloped suburbs (Troy, 1996, 2004). These newer suburbs typically had reduced potential for the traditional backyard vegetable garden compared with homes in previously established suburbs. This pattern of development was not restricted to Australia. For example, Jackson (1985) suggested that the form of Australian cities was similar with that of other New World cities (e.g., U.S., Canada, New Zealand, South Africa). In many of the Old World cities of Europe, the historic character was retained in older suburbs where individual gardens around dwellings remained intact. In contrast, suburban development and growth beyond these areas was more similar with New World than Older World cities. Typically, therefore, as has occurred in Australia, throughout the industrialised world the backyard urban garden has tended to decrease substantially in size over time. In parallel, there has been less reliance on backyard gardens for food production. This parallels the observations of Schupp and Sharp (2012, p. 103) who focused on the attitudinal, behavioural and demographic bases of household gardening. They suggested that behavioural and attitudinal attributes that were associated with home gardening were multifaceted and not necessarily attribute-specific although availability of space did influence participation in self-provisioning, even across a rural/urban spectrum.

5. Current gardening trends

Despite the demise of the urban backyard, in recent decades, growing produce to supplement the household diet has become increasingly popular. For example, in 2009, the sale of vegetable seeds in the U.S. increased by approximately 22% over the previous year which, in turn, had substantially increased sales over the previous year (Barnes, 2016). In Britain, seed sales have also escalated and there has been a switch from a preference for flower to vegetable seeds. For example, in 2010, 78% of all seeds sold were vegetables whereas a decade previously 70% of seed sales were flower seeds. In the same year, there was a 40% rise over the previous year in the sale of greenhouses, potting sheds, and garden tools (Wallop, 2010).

Gross and Lane (2007) suggested that the proliferation of television gardening and garden makeover programs that had occurred since the 1990 s was a contributing factor to the resurgence of interest in gardening. Equivalent garden programs have been popular in Australia although it is my observation that there has been an even greater increase in the popularity of television programmes depicting some genre associated with cooking (e.g., cooking competition, healthy diet). For example, together with five sport and four news programs, three with a focus on food/gardening were among the top 20 commercial television shows that drew the "highest number of viewers who 'especially choose to watch' …" the programs in 2016 (Roy Morgan, 2017). In addition, there has been an avalanche of 'get fit'/get healthy and weight loss programs that have encouraged healthy eating, often advocating organic foods and/or superfoods. Indeed, Australian prime time television is often dominated by programs, directly or indirectly, discussing food: its growing, preparation, and the benefits of fresh/organic/home grown foods. This has been paralleled by an increase in the variety of seeds and seedlings available in local gardening outlets where, in addition to seeds of fruits and vegetables that can be obtained in the market, the seeds of 'heirloom' cultivars have become widely available (pers. obs.).

One example of the changes occurring in the profile of home grown produce in industrialised countries may be gleaned from the attitudinal change in the U.S., to having a vegetable garden on the White House (Washington DC) lawns. After the popularity of 'victory gardens' of the World War I, that sprung up due to widespread food shortages, the President's wife, Eleanor Roosevelt, encouraged their return in World War II by introducing a garden to the White House lawns in 1943 (Anon., 2009). When more recently the Clintons sought to reinstate the vegetable garden at the White House it was considered inappropriate although one was ultimately placed in an 'inconspicuous' corner of the White House roof (Barnes, 2016). More recently, another President's wife, Michelle Obama, was influential in the introduction of a vegetable garden within the formal South Garden of the White House. Rather than being introduced to overcome food shortages or rising food prices as occurred historically, the drivers for the contemporary White House vegetable garden was part of an ethos of respecting 'the pedigree of the product and manner it is grown, gathered, raised or caught' (Destries, 2009). An additional stated reason for the latest White House garden is to 'initiate a national conversation around the health and wellbeing' of Americans (Anon., 2015a). There is no doubt that these changing trends and reasons for growing produce also influence Australians.

6. Yesteryear and today

As alluded to above, throughout human history, vegetable gardens have been associated with urban landscapes. In the early colonial days of the New World (e.g., Australia - Burgin, 2015; U.S. - Barnes, 2016) growing produce to supplement the household diet was a necessity of life for most, and urban allotment size typically accommodated this 'need'. The subsequent waxing and waning of the vegetable garden has been strongly influenced by economic necessity. When there is an economic downturn, homeowners resurrect (or develop) the backyard garden to produce food whereas when there has been an economic upturn, the garden is often neglected and/or transitions to a recreational space typically with ornamental plants and lawns and/or hard surfaces.

In recent decades, there has been a surge in gardening that has been beyond the basic economic need to supplement the household diet. Indeed, Gaynor (2001) found that post-war backyard food production was most often the purview of the 'middle class' rather than the 'working class'. This resurgence in growing produce is despite a trend towards smaller urban backyards (or even no backyard). Where space is at a premium (e.g., in high rise buildings), gardeners may resort to growing 'container gardens'. In other areas where backyard space is at a premium there is often the potential to reduce lawn areas within the property and/or remove ornamental plants, develop wall gardens, and even create roof gardens. In addition, there is increasing interest in community gardens (Henderson and Hartsfield, 2009; Mazereeuw, 2005; Tornaghi, 2014).

Despite the continued decline in potential urban backyard garden space, there has been an upsurge in the 'food movement'. This has been largely driven by a focus on health and wellbeing (see e.g., Anon., 2015a). One factor in this change has been the ongoing fear of food contamination. For example, a major produce recall in Australia that received substantial media coverage (e.g., Anon., 2015b; Noble et al., 2015; Santow, 2015), resulted from an outbreak of hepatitis A that was linked to frozen berries grown in China and Chile, packaged in China, and sold in Australia (Santow, 2015). This was, only one of nearly 200 products on sale in Australia and destined for consumption that were recalled in the six months previous too the berry scare. Some of these

products may have included contaminants that could cause, for example, miscarriage or cholera (Marszalek, 2015). The issue is not however, unique to food imported into Australia. For example, there has been a recent outbreak of listeria that proved fatal to some individuals (Pallin, 2018). This outbreak resulted from contaminated rock melons grown and processed within Australia (Claughton et al., 2018).

In addition to the issues of healthy food, supply may also once again become an issue. For example, commitments of world leaders to reduce carbon emissions in response to climate change and/or enhanced radical activity by extremists that may interrupt the flow of fossil fuel will require urban inhabitants to rely less on food being grown as broad-acre crops and transported (often) long distances and thus to become more food self-sufficient. Evidence of the impact that could arise with even a relatively short-term interruption to the supply of fossil fuel to a country was demonstrated by the 1973 Arab oil embargo on the U.S. (Campbell and Laherrère, 1998; Corbett, 2013), and by the longer-term disruption to Cuba's food supply (Altieri et al., 1999; Funes et al., 2002; Koont, 2008). It is inevitable that, at least intermittently, there will be a decline in fossil fuel (e.g., due to war, climate change and/or other interruption to its flow). These are all issues that are more likely to occur in the future than in the past. Under such circumstances, the need for self-sufficiency may be permanent and unavoidable. For example, a sharp decrease in fuel availability would have immediate impact on air and sea movement between countries and thus trade, not least because of higher fuel prices. It would also impact broad-acre agriculture and therefore, just as has occurred previously with economic downturns and food shortages, the need for self-sufficiency within the urban community would increase.

7. The future

As outlined above, with the anticipated continuously increasing world population, cities will become more densely populated, and thus fewer people will have access to an urban backyard. This transition is occurring in Australia. In response, at all levels of government, there is investment in 'greening' Australian suburbs although it appears that the 'battle' is being lost. For example, based on tree and shrub cover, there continues to be a loss of vegetation in urban local government areas (LGAs). For example, between 2008 and 2016, none of the LGAs had an increase in vegetation cover. Overall, across Australia, the loss was 2.6% (1586 square kilometres), equivalent to an area the size of Brisbane (Amati et al., 2017) with a population 2.31 million in 2014–2015 (ABS, 2016). Much of this loss is associated with urban consolidation. For example, in Sydney, apartment blocks are being built on lands where once there were 'industrial buildings, commercial premises, car parks or waste ground' (Ticher, 2018, p. 1) or indeed any other available open space.

Together with the demand for land for new residential dwellings and increasing numbers of apartments, in recent decades there has also been an increase in demand for vacant land in the inner city for community gardens (Burgin et al., 2014). Although many LGAs are supportive of these gardens, in some suburbs there are long waiting lists for access to land for their establishment (Jackson, 2018). One reason for this apparent shortage of land is that, in addition to the demand land for apartments (see e.g., Ticher, 2018), potential land for community gardens must compete with other demands for community greenspace, typically already developed as formal gardens and lawns for aesthetics and exercise. Some (e.g., Chiesura, 2004; Mazereeuw, 2005; Thwaites et al., 2005; Wolch et al., 2014) even consider that such green open space is 'crucial' for the quality of life of city residents (Barbosa et al., 2007).

In Australia, sport 'is part of the national identity', and open space for it is 'an assumed right'. Even for such high-profile land use, there is a shortage of open space for playing fields in some Sydney LGAs. This was revealed in interviews with key outdoor staff (Burgin et al., 2014). It was considered that the areas provided for both formal and informal sport exceeded carrying capacity. Apart from the overall increase in outdoor activities due to the increased interest in exercise and well-being, a major concern that arose from the interviews was the loss of open space within school grounds due to the Federal Government's stimulus package in response to the 2007–2008 Global Financial Crisis. Particularly in the inner suburbs, buildings of selected schools were often erected on the only remaining open space within school's precinct. This, in turn, has placed additional pressure on public open space for students' outdoor activities. This has tended to result in substantial additional pressure on local sporting fields. Together with the upturn in outdoor recreational activities more generally, there has been increased pressure on LGAs to provide additional outdoor facilities (Burgin et al., 2014). Community gardens therefore represent just one need for public open space.

Where such restrictions are not in place, an alternative is to switch from the backyard garden to using the front garden although even in this privately-owned space there may be associated policy and legal issues. In Australia, there may be restrictions in LGA policies concerning the appearance and use of outdoor areas of the urban home. For example, in much of Canberra there has been a ban on front fences for nearly a century (Saxberg, 2016). In addition, for private homes, approval is required for landscaping and all other treatment of the soil surface, including plantings to all exterior surfaces (EPSDD, 2016).

Use of the front verge (cf. curb side) or other public space for vegetables is another option. This verge of the Australian suburban home is public property. In the past, plantings in this street area were restricted to lawns and 'street trees' although this is rapidly changing in some areas. Increasingly, local governments are allowing the adjacent home owner to use this space for gardens, including for vegetables (e.g., some suburbs of Canberra [Australia's National Capital], ACT Government, 2018; Marrickville Council, 2018; Young, 2017 [Bayswater Council, Perth]; Chakori, 2018 [Brisbane City Council]). Some, including Brisbane City Council, encourage residents to plant verge gardens (Chakori, 2018). Elsewhere LGA authorities have not always been empathetic (e.g., Leichhardt Council Municipality Council [Inner West, Sydney] - Carey, 2013; Sunshine Coast Council [Queensland] – Gaffney et al., 2017).

As with verge suburban gardens in Australia, where it occurs, the initiatives for urban agriculture in cities, for example, community gardens, have been predominantly driven by the community - individuals, community groups and/or local non-governmental organisations (Bourque, 2000; UNDP, 1996). In such situations, Bourque (2000) suggested that 'preconceptions of technocratic city planners and managers' seek to prevent success. Changing misconceptions and government policies are required to overcome issues associated with any move toward higher levels of self-sufficiency against a background of higher density urban populations. The recent experience in Australia with wider acceptance of verge gardens indicates that attitudes are changing.

Arguably the most critical factor in the neglect of urban agriculture within planning has been that, unlike other 'community systems' (e.g., environment, economy, housing) and the interconnections among them, the 'food' system has been 'a stranger to the planning field' (Pothukuchi and Kaufman, 2000). More recently, Morgan (2009) suggested that this lack of attention to food systems within urban planning will come to be viewed as a 'puzzling omission'. These authors suggested that ultimately, this omission would be merely academic because 'food' was about to become 'an important and legitimate' segment of the planning agenda in many countries. More recently, Morgan (2013) suggested that as progress is continuing, 'food' is being taken seriously by the planning community (academics and professionals).

Although more about 'food justice' and 'sustainable agriculture' (Alkon and Agyeman, 2011), there are now entities such as food policy councils in the U.S., food boards (London), and food partnerships (Brighton) in England established with representation from government, the private sector, and the community (Reed and Keech, 2017).

Although Morgan (2015) suggested that the 'new food equation' had been integrated into planning across Europe and the U.S., the dialogue appears to continue to be largely focused on urban food security - access to food rather than its supply. Such outcomes are a result of the recognition that 'food' needs to be embedded in planning, and the long history of community gardening (at least) within the U.S. (Morgan, 2015). It may therefore be assumed that the role of the home garden will ultimately become considered as part of planning in Australia.

Part of the reason for this optimism is the dramatic upturn in agricultural degrees in recent years. For example, Parkinson (2016) reported that Australian agriculture had entered 'a new growth phase'. There has been a revival in interest in agricultural courses, albeit from a low base due to shrinking interest during the previous two decades. The trend is even more dramatic in U.S. universities. Although the 23 land grant colleges that have traditionally taught broad-acre agriculture continue to do so, there are now some 300 colleges/universities across the U.S. that teach 'agriculture'. The additional institutions that have introduced agriculture typically have much less available land space than the broad-acre institutions, predominantly as little as 0.5 acre (2023 m^2). Teaching in these universities also differs from the traditional approach to teaching agriculture. The subjects in agriculture in these universities are typically open to all students no matter what their major. Teaching with an agricultural bias, such subjects are very much designed to capture students with an interest in social sustainability, environmental and human health, or community building (LaCharite, 2016). This integration of agriculture across the disciplines should ultimately change attitudes to urban agriculture across the broader community.

8. Conclusion

With the increasing recognition of urban agriculture in industrialised nations, self-provisioning from the vegetable garden, whether in the backyard or elsewhere within the footprint of the allotment or nearby, may once again play an important role in urban self-sufficiency. In the longer term this will occur only if 'food' becomes embedded as a community system along with the others (e.g., housing, water) that have been embedded within planning.

Based on extensive experience within natural resource management where issues as large as restoring environmental flows to the largest river system in Australia (Murray-Darling) and stopping the destruction of native vegetation have been tackled, I am certain that to maintain the current trajectory and momentum outlined above for urban agriculture will require broad community participation in government policy development. Only then, will the increasing desire to go back to the future and transform the urban landscape in support of greater food self-sufficiency be achieved.

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